

Claims

We claim:

1. A semiconductor die package comprising;
a semiconductor die;
a leadframe having a chemically-etched surface; and
a capsule enclosing said die and at least a portion said leadframe.
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2. The semiconductor package of Claim 1 wherein said leadframe consists essentially of copper alloy.
3. A semiconductor die package comprising a semiconductor die, a leadframe having a roughened surface, and a capsule enclosing said die and at least a portion of said leadframe, wherein a surface of said leadframe is roughened by exposing said surface to a chemical etchant, thereby enhancing adhesion between said leadframe and said capsule.
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4. The semiconductor package of Claim 3 wherein said leadframe comprises copper alloy.
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5. The semiconductor package of Claim 4 wherein said chemical etchant comprises sulfuric acid.
6. The semiconductor package of Claim 5 wherein said chemical etchant comprises hydrogen peroxide.
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7. The semiconductor package of Claim 6 comprising an organo-metallic oxide on the surface of the leadframe.
8. A process of fabricating a plurality of semiconductor die packages comprising:
fabricating an array of leadframes, said leadframes connected together by a plurality of tie bars, each of the leadframes in the array comprising a die attach pad and a plurality of leads;
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exposing at least a portion of each of said leadframes to a chemical etchant so as to roughen a surface of said leadframes;
attaching a semiconductor die to each of said die attach pads;

covering a portion of said leadframes and the semiconductor dice with a molten plastic to encapsulate said dice and said leadframes; and

separating said leadframes to form said semiconductor die packages.

- 5 9. The process of Claim 8 wherein said leadframes comprise copper.
10. The process of Claim 9 wherein said chemical etchant comprises sulfuric acid.
11. The process of Claim 9 wherein said chemical etchant comprises hydrogen peroxide.
- 10 12. The process of Claim 11 wherein said chemical etchant comprises hydrogen peroxide in a concentration in the range of 1.8% to 3.5% by volume.
- 15 13. The process of Claim 9 comprising treating said leadframes with one or more chemicals selected from the group consisting of potassium hydroxide, a mixture of sodium hydroxide and sodium metasilicate, a mixture of hydroxyacetic acid, citric acid and butyl carbitol, and a mixture of sodium hydroxide and ethylenediamine.
14. The process of Claim 13 comprising treating said leadframes with a corrosion inhibitor following treating said leadframes with an alkaline chemical.
15. The process of Claim 14 wherein said corrosion inhibitor comprises one or more chemicals selected from the group consisting of the triazoles, the bezotriazoles, the imidazoles, the benzimidazoles, and the tetrazoles.
- 20 16. The process of Claim 8 comprising:
 - a pre-dip step, which renders the surface of said leadframes more chemically active; and
 - an etching/coating step.
- 25 17. The process of Claim 16 wherein said pre-dip step comprises exposing said leadframes to a solution containing an acid and an oxidizing agent.

18. The process of Claim 17 wherein said oxidizing agent comprises a chemical selected from the group consisting of hydrogen peroxide and hydrogen persulfate.

19. The process of Claim 16 wherein said oxidizing agent comprises hydrogen peroxide in a concentration in the range of 1.8% to 3.5% by volume.

5 20. The process of Claim 16 wherein said etching/coating step comprises exposing said leadframes to a solution containing an acid and an oxidizing agent.